DRAFT
2012 Annual Groundwater Monitoring Report
Arizona Public Service
501, 502, and 505 South Second Avenue
Phoenix, Arizona

Motorola 52nd Street Superfund Project
Operable Unit 3
U.S. EPA Docket # 2004-25
AMEC Project No. 14-2012-2000

Prepared For:

aps

Prepared By:

amec

April 2013

Certified Mail: 7012 2920 0000 8926 3146
Return Receipt Requested

April 17, 2013

Janet Rosati
Remedial Project Manager
US Environmental Protection Agency
75 Hawthorne Street (SFD-6-2)
San Francisco, CA 94105

Re: Motorola 52nd Street Superfund Street Site
Arizona Public Service Company
Pinnacle West Capital Corporation
505, 502, 501 South 2nd Avenue
U.S. EPA Docket No. 2004-25
DRAFT- 2012 Annual Groundwater Monitoring Report, dated April 11, 2013

Dear Ms. Rosati:

Arizona Public Service Company and Pinnacle West Capital Corporation (collectively "APS") hereby submits this *Draft 2012 Annual Groundwater Monitoring Report, APS 501, 502, and 505 South 2nd Avenue, Phoenix, Arizona, Motorola 52nd Street Superfund Project, Operable Unit 3, USEPA Docket No 2004-25, April 11, 2013.* This groundwater monitoring report presents the analytical results for the first and third quarters of 2012 groundwater sampling of the APS Facility monitoring wells. The analytical results from the 2012 groundwater sampling are consistent with the results and support the conclusions presented in the *Final Focused Remedial Investigation Report* (AMEC 2010), specifically with regard to historical groundwater flow and the stable concentrations of COCs detected in the groundwater below EPA MCLs.

This submission is made pursuant to APS' Administrative Order on Consent (AOC) with the EPA which became effective July 29, 2004. This report has been prepared by AMEC Environment & Infrastructure, Inc. on behalf of APS for the facility owned and operated by APS. The facility is located within Operable Unit 3 (OU3) of the EPA Motorola 52nd Street Superfund Site[1] and is located at 501, 502, and 505 South 2nd Avenue (APS Facility) in Phoenix, Arizona.

[1] Per Section V.11.h. of the AOC, "Motorola 52nd Street Superfund Site shall mean Operable Units 1, 2, 3 of the Motorola 52nd Street Superfund Site, located within the approximate boundaries of the 52nd Street to the east, 7th Avenue to the west, McDowell Road to the north, and Buckeye Road to the southwest."

If you have any questions or comments on the report, or need additional information, please call or email me.

Sincerely,

Judy Heywood
Remediation Project Manager

enclosure

1 hardcopy and 1 electronic disk

c.c.

Brian Stonebrink, ADEQ (1 hard copy 1 electronic disk)
Sue Kraemer, Shaw E&I (1 hard copy 1 electronic disk)
Doug Hulmes, Shaw E&I (1 electronic disk)
Suneeta Sahgal, USACE (1 electronic disk)

Molly Cagle, Baker Botts (1 hardcopy, 1 electronic disk)
Kenneth Miller, PNW (1 hard copy 1 electronic disk)
James Oliver, Schlumberger (1 electronic disk)
Laura Menken, Hargis + Associates (1 electronic disk)
Joe Pisano, AMEC w/o attachments

Judy Heywood
Arizona Public Service Company
Environmental, Policy & Programs

Tel. 602-250-3850
Mobile (602) 818-0259
e-mail judith.Heywood@aps.com

PO Box 53999
Mail Station 9303
Phoenix, Arizona 85072-3999

DRAFT
2012 ANNUAL
GROUNDWATER MONITORING REPORT

Arizona Public Service
501, 502, and 505 South Second Avenue
Phoenix, Arizona
Motorola 52nd Street Superfund Project
Operable Unit 3

Submitted to:

Arizona Public Service Company
Phoenix, Arizona

Submitted by:

AMEC Environment & Infrastructure, Inc.
Phoenix, Arizona

April 17, 2013

AMEC Project No. 14-2012-2000

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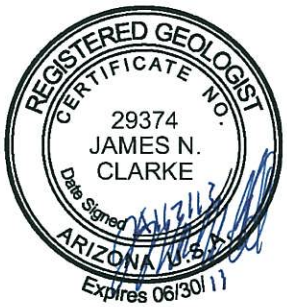

LIST OF ACRONYMS AND ABBREVIATIONS

320 WLS	320 West Lincoln Street
µg/L	micrograms per liter
ADEQ	Arizona Department of Environmental Quality
AMEC	AMEC Environment & Infrastructure, Inc.
amsl	above mean sea level
AOC	Administrative Order on Consent
APS	Arizona Public Service Company and Pinnacle West Capital Corporation
AWQS	aquifer water quality standard
COCs	contaminants of concern
EPA	United States Environmental Protection Agency
FSP	Field Sampling Plan
gpm	gallons per minute
IDW	investigation derived waste
LCS	laboratory control sample
LES	Liquid Environmental Solutions
M	first Intermediate zone
M2	second intermediate zone
MCL	maximum contaminant level
MDL	method detection limit
MS/MSD	matrix spike/matrix spike duplicate
MW	monitor well
OU3	Operable Unit 3
PCE	tetrachloroethene
PE	performance evaluation
QA/QC	quality assurance/quality control
QAPP	quality assurance project plan
RL	reporting limit
RPD	Relative Percent Difference
S	shallow zone
TA	TestAmerica, Inc.
TCE	Trichloroethene
VOCs	volatile organic compounds

1.0 INTRODUCTION

Arizona Public Service Company and Pinnacle West Capital Corporation (collectively "APS") entered into an Administrative Order on Consent (AOC) with the United States Environmental Protection Agency (EPA) effective July 29, 2004 (EPA 2004). Pursuant to the AOC, APS performed certain work outlined in a statement of work attached to the AOC. This annual report has been prepared by AMEC Environment & Infrastructure, Inc. (AMEC) on behalf of APS for the facility owned and operated by APS.

The APS facility is located within Operable Unit 3 (OU3) of the EPA Motorola 52nd Street Superfund Site (see Figure 1). It consists of properties at 501, 502 and 505 South 2nd Avenue (APS Facility) in Phoenix, Arizona (see Figure 2). The APS Facility is currently used for vehicle maintenance, office space, paved parking areas, equipment storage areas, and an electrical substation. A detailed description of the APS Facility has been provided in the Final Focused Remedial Investigation Report (AMEC 2010).

Groundwater monitoring at the APS Facility began in September 1997. Initially, groundwater monitoring included monitor wells MW-1-S, MW-2-S, MW-3-S, and MW-4-S and continued through 2001. After the issuance of the AOC (EPA 2004), 14 additional monitor wells were installed at the APS Facility. Thirteen new monitor wells were installed in 2005 and 2006: MW-1-M, MW-1-M2, MW-2-M, MW-2-M2, MW-3-M, MW-3-M2, MW-4-M, MW-5-S, MW-5-M, MW-5-M2, MW-6-S, MW-6-M, and MW-6-M2. The last well (MW-7-S) was installed in 2007 to evaluate groundwater outside the APS Facility site.

Wells at 320 West Lincoln Street (320 WLS) were added to the APS groundwater sampling and water-level measurement program for the purpose of identifying the lateral extent of contamination from the western boundary of the APS 502 Property. APS began collecting water quality samples and water-level measurements from wells at the 320 WLS Property in September 2007; this was continued for shallow zone monitor wells through March 2009. Groundwater monitor well locations at the APS Facility and the 320 WLS Property are presented on Figure 3.

AMEC has completed groundwater monitoring for the first and third quarters of 2012 at the APS 501, 502, and 505 South 2nd Avenue Facility in accordance with the activities described in the Sampling and Analysis Plan (AMEC 2005a) and following AMEC's Health and Safety Plan (AMEC 2005b). The objective of the semi-annual groundwater monitoring program is to document changes in water quality at the APS Facility. Groundwater testing has been limited to the contaminants of concern (COCs), per paragraph 9 of the AOC, as identified in Attachment A of the statement of work (EPA 2004). Specifically, the COCs, as identified in the AOC, for this site are:

- Chloroethane
- 1,1-Dichloroethane
- 1,2-Dichloroethane
- 1,1-Dichloroethene
- cis-1,2-Dichloroethene
- trans-1,2-Dichloroethene
- Tetrachloroethene (PCE)
- 1,1,1-Trichloroethane
- 1,1,2-Trichloroethane
- Trichloroethene (TCE)
- Vinyl chloride
- 1,4-Dioxane

Prior to collection of the groundwater samples in September 2008, APS requested that 1,4-dioxane be removed from the analyte list since it had not been detected in any sample since 2006. 1,4-dioxane was detected once at a concentration of 1.1 micrograms per liter (µg/L), which was 0.1 µg/L greater than the reporting limit (RL) of 1.0 µg/L. The EPA approved the request on September 4, 2008 (EPA, 2008a); therefore no groundwater samples were analyzed for 1,4-dioxane in 2012.

2.0 GROUNDWATER ELEVATION

APS currently measures water levels at APS Facility monitor wells on a quarterly basis (see Figure 3). Water level measurements are collected during time periods consistent with regional OU3 water level measurements, and the data is incorporated into the regional OU3 well network maintained by the Arizona Department of Environmental Quality (ADEQ). The measurements provide information on water-level changes over time and the direction and gradient of groundwater movement. Quarterly water level data have been submitted to the EPA and the ADEQ from 1997 through December 2012. Water levels were measured in site wells during 2012 on the following dates:

Quarter	Date
First Quarter 2012	March 5, 2012
Second Quarter 2012	June 6, 2012
Third Quarter 2012	September 7, 2012
Fourth Quarter 2012	December 10, 2012

Table 1 presents groundwater elevation data collected from wells at the APS Facility in 2012. The water-level hydrographs for APS Facility wells are presented in Figures 4 through 6. Seasonal trending is observed in all monitored zones for the period of record with increased groundwater elevation in the spring and decreased elevations in the fall. Groundwater elevation at the APS Facility generally increased from 2008 until 2011, with the highest elevations measured in March 2011 in all three monitoring zones. Groundwater elevations measured in 2012 have generally decreased relative to 2011 elevations. Between 2008 and 2012, the lowest water table elevations in all monitored zones were measured in September 2008. Groundwater elevations in 2012 were reported to range as follows in each monitoring zone:

Monitored Zone	Range in Groundwater Elevation During 2012
Shallow	981.83 to 990.87 feet above mean sea level (amsl) (MW-5-S [September 2012] and MW-1-S [March 2012], respectively)
Intermediate	981.95 to 990.71 feet amsl (MW-6-M [September 2012] and MW-4-M [March 2012], respectively)
Second Intermediate	981.91 to 990.80 feet amsl (MW-6-M2 [September 2012] and MW-1-M2 [March 2012], respectively)

Field logs for the events outlined above are provided in Appendix A.

Measurement of water levels at the APS Facility began in September 1997 on the first four monitor wells (MW-1-S, MW-2-S, MW-3-S, and MW-4-S), and continued through 2001. Water levels in APS Facility groundwater monitor wells MW-1-M, MW-1-M2, MW-2-M, MW-2-M2, MW-3-M, MW-3-M2, MW-4-M, MW-5-S, MW-5-M, MW-5-M2, MW-6-S, MW-6-M, and MW-6-M2 were collected on a monthly basis between 2005 and 2008. Water levels in MW-7-S were collected on a monthly basis between 2007 and 2008. Water-level measurements in the APS Facility wells were increased from monthly to weekly from February 6, 2009, to May 29, 2009, to assess the impacts of the flows in the Salt River at the APS Facility. Beginning in September 2009, the frequency of water-level monitoring at the APS Facility was reduced to quarterly.

Groundwater elevation data measured in September 2012 were used to interpret the potentiometric surface of the shallow, intermediate, and second intermediate zones displayed on Figures 7, 8, and 9, respectively. These figures display the magnitude and direction of groundwater flow for each monitoring zone. Historically, groundwater flows in this area have been to the west-southwest, as is represented by the data presented in Figures 7 through 9.

3.0 GROUNDWATER SAMPLING

Groundwater monitoring for 2012 was performed in accordance with the sampling procedures described in the Sampling and Analysis Plan (AMEC 2005a). The frequency of groundwater sampling was decreased from quarterly to semi-annual in the Sampling and Analysis Plan – Field Sampling Plan (AMEC 2005a). This report was subsequently approved by EPA in a letter dated May 19, 2005, thus approving the decrease in sampling frequency (EPA 2005). Additionally, the decrease in groundwater sampling frequency from semi-annual to annual in the first intermediate and second intermediate monitor wells beginning in 2008 was outlined in the 502 Property Completeness Review Technical Memorandum (AMEC 2008). EPA issued a letter dated November 18, 2008 approving this document, therefore approving the decrease in sample frequency (EPA, 2008b).

Groundwater samples were collected from wells as outlined below:

	First Quarter 2012	Third Quarter 2012
Shallow Wells	MW-1-S, MW-2-S, MW-3-S, MW-4-S, MW-5-S, MW-6-S, and MW-7-S	MW-1-S, MW-2-S, MW-3-S, MW-4-S, MW-5-S, MW-6-S, and MW-7-S
First Intermediate Wells	Not Sampled	MW-1-M, MW-2-M, MW-3-M, MW-4-M, MW-5-M, and MW-6-M
Second Intermediate Wells	Not Sampled	MW-1-M2, MW-2-M2, MW-3-M2, MW-5-M2, and MW-6-M2

Specific dates related to the 2012 groundwater sampling events are listed below:

Quarter	Dates of Sampling
First Quarter 2012	March 6 to 7, 2012
Third Quarter 2012	September 10 to 13, 2012

The following subsections discuss protocols for groundwater sampling, quality assurance/quality control (QA/QC) procedures, data validation, sample results, and handling of purge water during sampling. The groundwater sampling logs, with field monitoring parameters, well volume calculations and sampling information, are presented in Appendix A. The laboratory analytical reports are presented in Appendix B. Purge water disposal documentation is presented in Appendix C.

3.1 Groundwater Sampling Protocol

Well purging and sampling were performed using dedicated Grundfos® submersible pumps for all APS Facility wells. The wells were purged at a rate of approximately 3 gallons per minute (gpm) for shallow zone wells and approximately 5 gpm for first and second intermediate wells. Vinyl tubing dedicated to each well was utilized for discharge of well purging water into a trailer mounted water tank. Field measurements of pH, turbidity, conductivity, temperature, dissolved oxygen, and oxidation-reduction potential were collected during the purging process. When groundwater field monitoring parameters had stabilized to within 10 percent of the previous reading for at least three successive readings and a minimum of three well volumes had been purged, a groundwater sample was collected from the well. The groundwater sample was collected from the Grundfos® pump utilizing a pumping rate of approximately 100 milliliters per minute. The groundwater sample was placed into sample containers provided by the laboratory. The field monitoring parameters are presented in the sample collection logs in Appendix A.

The samples were labeled to indicate the project name and number, sample location, sample designation, date and time of sample collection, initials of the sample collector, sample matrix (type of sample), and the analysis required. Each sample collected for laboratory analysis was placed in a cooler with ice to maintain the sample temperature at approximately 4 degrees Celsius pending transport and delivery to the analytical laboratory. Samples were transported to the laboratory following standard chain-of-custody protocol. The samples were transported by AMEC personnel to the state-certified analytical laboratory, TestAmerica, Inc. (TA), in Phoenix, Arizona.

The samples were analyzed for volatile organic compounds (VOCs) using EPA Method 8260B. The results of the VOC laboratory analysis are summarized in Table 2. The laboratory analytical reports are presented in Appendix B for each semi-annual sampling event.

3.2 Quality Assurance/Quality Control

QA/QC procedures used during the sampling program were in accordance with the approved Field Sampling Plan and Quality Assurance Project Plan (QAPP) prepared by AMEC on April 2004. QA/QC procedures completed in the field included equipment decontamination, collection of duplicate groundwater samples, the analysis of daily trip blanks, the collection of sample volume for matrix spike/matrix spike duplicates (MS/MSD), and the use of nitrile gloves by the

sample collector. Duplicate samples were collected at the following well locations for the respective sampling events:

- MW-1-S and MW-6-S during March 2012
- MW-1-S and MW-6-S during September 2012

Additional sample volume was collected at monitor well MW-3-S for the MS/MSD at the March and September 2012 sampling events.

Duplicate samples were submitted to the laboratory for VOC analysis, representing approximately 10 percent of the total number of original samples. In addition, an equipment rinsate blank and field blank were collected to monitor the effectiveness of the equipment decontamination process. Blind Performance Evaluation (PE) samples were also submitted with the sample set on March 7, 2012 and September 12, 2012. PE samples were spiked with known concentrations of TCE, PCE, and carbon tetrachloride. Certificates showing the spiked concentrations are included in Appendix D. Additional QA/QC procedures were completed by the analytical laboratory, including analysis of method blanks, MS/MSD samples, and laboratory control sample/laboratory control sample duplicates.

3.3 Data Validation

In addition to QA/QC procedures, data validation was performed for each sampling event in 2012. A general discussion outlining the data flagged during validation for each sampling event in 2012 is provided in the following sections. Detailed data validation reports are provided in Appendix E. Data were reported by TA with appropriate ADEQ qualifiers. Data below the reporting limit (RL) were qualified as estimated (J).

3.3.1 Qualification of Blanks

Compounds, including target analytes, found in method, field, and trip blanks during the March and September 2012 sampling events are summarized in the table below.

Compounds Detected in Trip, Method, and Field Blanks

	March 2012	September 2012
Trip Blanks	none	acetone
Method Blanks	hexachlorobutadiene	naphthalene
Field Blanks	chloroform	none

* - Estimated value; below RL

3.3.2 Qualification of Samples

Qualifications, other than those related to blanks, were made for the March and September 2012 sampling events as reported in the sections below.

March 2012 Data

Hexachlorobutadiene was detected in both method blanks for reports PVC0524 and PVC0465 at 1.1 µg/L, which is slightly above the RL. This is attributable to carryover in the system. Hexachlorobutadiene was detected in most samples at lower concentrations, below the RL. All detections for this compound have been qualified to be non-detected at the RL.

Chloroform was detected at a trace level in the field blank for the samples collected on March 7, 2012 (PVC0254). Levels of chloroform in samples MW-7-S, MW-5S-A-030712, and MW-4S-A-030712 fell below 5 times the field blank concentration. In accordance with EPA Guidelines, these results have been qualified to be non-detected at the level detected, but it should be noted that chloroform has been detected historically in these wells without blank detections.

Naphthalene recovered marginally above the control limit in one laboratory control sample (LCS) accompanying the March 7, 2012 samples. Naphthalene was not detected in any program samples and no data have been qualified.

ADEQ qualifiers for blank contamination are defined for instances where the blank is above the RL. For the purposes of this project, the B1 flag has been applied to those results where the reported detection has been qualified to be non-detected based on a blank detection between the method detection limit (MDL) and RL.

A PE sample, prepared by ERA of Golden, Colorado was submitted to TA with March 2012 program samples in accordance with the Sampling and Analysis Plan (AMEC 2005a). The PE sample was certified with known concentrations of PCE, carbon tetrachloride, and TCE. Results of all analytes fell within the performance limits (See Appendix D).

September 2012 Data

Documentation lapses in the laboratory were noted during the data validation review. Upon notification by AMEC, the laboratory reviewed records, confirmed that data as reported were correct and initiated corrective actions. Documentation on the laboratory's responses and copies of the Corrective Action Reports are provided in Appendix E.

A PE sample, prepared by ERA of Golden, Colorado and certified with known concentrations of PCE, carbon tetrachloride, and TCE, was submitted to TA with September 2012 program samples. Results of the TA analysis were observed at values within the identified performance limits for carbon tetrachloride and PCE, but the TA laboratory result for TCE was slightly below the lower performance limit. The apparent recovery was 71.5%.

Performance Evaluation Sample Analyses, September 2012

Analyte	Result µg/L	Certified Value µg/L	ERA Performance Limits
TA, September 2012			
Carbon Tetrachloride	7.2	7.51	4.87 - 9.40
PCE	5.1	7.20	4.54 - 8.62
TCE	5.2	7.27	5.38 - 8.72

The notes on ERA's certification documentation for the whole volume PE samples indicates that the performance limits may not be applicable since the analyte concentrations were detected lower than their normal manufacturing range. However, no apparent reason for the discrepancy could be identified with the analysis performed by TA. Accuracy for all analytes was acceptable in the calibration check standard, blank spikes and matrix spikes accompanying these samples. The calibration curve did not show any trends in response factors at lower concentrations that would explain the low result. Peak integrations appeared correct and calculations were verified.

After TA was notified by AMEC that the reported TCE result fell outside the acceptance limits, the laboratory initiated a full investigation, including analyses of retained samples of the ERA PE sample. Results for the re-analyses of the PE sample in December 2012 by both the Phoenix and Denver TA labs were within acceptance limits. Results for an additional quality control sample procured from another vendor were also acceptable. TA concluded that the result was an "anomaly".

Historical data were reviewed to determine if the PE result likely indicated significant low bias to sample results. During the monitoring period of 2009 to present, levels of TCE above the RL of 0.5 µg/L have been detected only in the groundwater samples collected at MW-2-S, MW-3-S, MW-6-S and MW-7-S wells. As presented below, results for these wells from the September 2012 sampling event fall within the range of recent data.

Monitoring Well	2009		2010		2011		2012	
	March	Sept.	March	Sept.	March	Sept.	March	Sept.
MW-2-S	0.45 J	0.72	0.42 J	0.57	0.99	0.56	0.24 J	0.39 J
MW-3-S	2.1	1.4	1.4	0.63	0.6	0.71	0.99	1.5
MW-6-S	0.67	1.6	2.5	1.1	0.99	<0.5	0.97	0.32J 0.48J
MW-7-S	0.57	<0.5	0.51	0.79	0.42 J	0.26 J	0.42 J	<0.5

The apparent recovery of 71% for the PE sample does not warrant rejection of the collected sample results, but all results and detection limits for TCE are qualified as estimated (J) with a potential low bias.

Recoveries of dibromochloromethane demonstrated variability above the control limit (24% relative percent difference [RPD] vs. limit of 22%RPD) for the LCS/LCS duplicate set associated with the analysis of three September 12, 2012 samples. Variability for recoveries of acetone (52% RPD vs. limit of 35% RPD) and 1,2,3-trichloropropane (25% RPD vs. limit of 20% RPD) were also above variability control limits for the LCS/LCS duplicate set associated with

September 10 samples. None of these analytes were detected in any program sample and no data have been qualified.

3.3.3 Data Validation Summary

Although data were flagged, as outlined above, March and September 2012 data were reviewed and deemed usable and of acceptable quality. Measurement quality objectives for accuracy, precision and sensitivity as defined by the QAPP for the COCs were achieved. Data validation reports for all sampling events are included in Appendix E.

3.4 Sampling Results

The groundwater sampling results for the COCs outlined in Paragraph 9 of the AOC (EPA 2004) are presented in Table 2 for First Quarter 2012 and Third Quarter 2012. As discussed previously in Section 1.0, EPA approved the request made by APS to remove 1,4-dioxane from the COC list in September 2008 (EPA, 2008a); therefore, no groundwater samples were analyzed for 1,4-dioxane in 2012.

Table 2 provides a comparison of groundwater sample results to the respective maximum contaminant levels (MCLs) and Arizona drinking water Aquifer Water Quality Standards (AWQS) for each COC. No COCs were detected above their respective MCLs and AWQS at APS Facility monitor wells in 2012. Concentrations of PCE and TCE in groundwater from February 2006 to September 2012 for the shallow, first intermediate, and second intermediate zones are provided in Figures 10 through 12, respectively.

As stated in Section 3.1, the groundwater sampling logs, with field monitoring parameters, well volume calculations, and sampling information are presented in Appendix A, and the laboratory analytical reports are presented in Appendix B.

3.5 Investigation Derived Waste – Groundwater Sampling

Investigation derived waste, consisting of purge water generated during sampling activities, was initially contained within a trailer-mounted 500-gallon water tank. The purge water was transferred to a 6,500-gallon poly tank pending disposal by Liquid Environmental Solutions (LES). LES mobilized to the Site and transferred the purge water into a tanker truck for transport to a disposal facility on March 8, 2012 and September 17, 2012. An APS representative was present during the purge water transfer. The purge water was transported to LES's disposal facility where pretreatment was performed before discharge into the City of Phoenix Sanitary Sewer. Copies of the non-hazardous liquid waste transportation trip tickets for the March and September 2012 sampling events have been included in Appendix C.

4.0 SUMMARY AND CONCLUSIONS

A summary of the groundwater sampling is provided below:

- Groundwater samples were collected semi-annually in March and September 2012.
- Water levels were measured on a quarterly basis.

- Data validation performed on the groundwater data concluded that the data meets the data quality objectives as specified in the QAPP.
- Concentrations of COCs in APS Facility monitoring wells are at levels below the MCLs and AWQS.
- The information from the 2012 groundwater sampling are consistent with and support the conclusions presented in the *Final Focused Remedial Investigation Report (*AMEC 2010). Specifically:
    - Historically, groundwater flows in this area have been to the west, with a southwestern component. The data generated in 2012 (See Table 1 and Figures 7 through 9), are consistent with the data presented in the Final Focused RI Report (AMEC 2010); specifically, Table 2-16 and Figures 2-28 through 2-45 (AMEC 2010).
    - Shallow monitoring zone groundwater wells will continue to be sampled on a semi-annual basis (MW-1-S through MW-7-S). Low concentrations of COCs continue to persist in the shallow zone monitor wells. The concentrations have remained stable with low seasonal variation. See Table 2 and Table 2-9 presented in the Final Focused RI Report (AMEC 2010).
    - The low COC concentrations detected in the intermediate and second intermediate monitoring zones are related to upgradient sources (See Table 2 and presented in the Final Focused RI Report (AMEC 2010), Table 2-9 and Figures 2-47 through 2-49).
    - The water level data on Table 1 indicate relatively stable conditions. Water levels will continue to be measured on a quarterly basis.
    - The concentrations of COCs detected in the groundwater remain stable and do not exceed MCLs and AWQS as indicated on Table 2. These data support the conclusion that the groundwater does not warrant active remediation.

5.0 REFERENCES

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_____. 2005. *Review of the APS Responses and Revised Reports Submitted April 22, 2005*: Responsiveness Summary EPA's Comments on the Revised Research Report dated January 20, 2005 and Revision Pages dated January 20, 2005 Responsiveness Summary EPA's Comments on the Revised Remedial Investigation/Feasibility Study Work Plan dated January 28, 2005 and Revised Work Plan Text and Figures dated April 22, 2005 Responsiveness Summary EPA's Comments of the Draft Sampling and Analysis Plan dated December 21, 2004 and Revised Sampling and Analysis Plan, dated April 22, 2005 Responsiveness Summary EPA Comments on the Health and Safety Plan dated December 21, 2004 and Revised Health and Safety Plan Text dated April 22, 2005, APS Properties at 501, 502, and 505 South 2nd Avenue in Phoenix, May 19.

_____. 2008a. *Letter to APS approving the request to discontinue groundwater sample analysis of 1,4-dioxane, Arizona Public Service 501, 502, and 505 South 2nd Avenue Site, Phoenix, Arizona.* September 4.

_____. 2008b. Letter to APS transmitting EPA's Approval of the *Technical Memorandum, APS 502 Completeness Review based on* the APS response to comments (October 24, 2008) on the EPA comments (October 7, 2008) regarding the Technical Memorandum APS 502 Completeness Review. November 18.

TABLES

Table 1 Ground Water Elevations 2012

SITE	WELL	DATE	DEPTH (ft bgs)	TOC Elevation (ft amsl)	Water Level Elevation (ft amsl)	SITE	WELL	DATE	DEPTH (ft bgs)	TOC Elevation (ft amsl)	Water Level Elevation (ft amsl)
505	MW-1-M	3/5/2012	87.76	1078.47	990.71		MW-4-S	3/5/2012	88.06	1078.44	990.38
		6/6/2012	91.62	1078.47	986.85			6/6/2012	91.71	1078.44	986.73
		9/7/2012	95.01	1078.47	983.46			9/7/2012	95.1	1078.44	983.34
		12/10/2012	94.82	1078.47	983.65			12/10/2012	94.98	1078.44	983.46
	MW-1-M2	3/5/2012	87.74	1078.54	990.8	502	MW-5-M	3/5/2012	87.55	1077.38	989.83
		6/6/2012	91.54	1078.54	987			6/6/2012	91.7	1077.38	985.68
		9/7/2012	94.91	1078.54	983.63			9/7/2012	95.2	1077.38	982.18
		12/10/2012	94.74	1078.54	983.8			12/10/2012	94.77	1077.38	982.61
	MW-1-S	3/5/2012	87.59	1078.46	990.87		MW-5-M2	3/5/2012	87.42	1077.32	989.9
		6/6/2012	91.34	1078.46	987.12			6/6/2012	91.56	1077.32	985.76
		9/7/2012	94.75	1078.46	983.71			9/7/2012	95.05	1077.32	982.27
		12/10/2012	94.59	1078.46	983.87			12/10/2012	94.61	1077.32	982.71
501	MW-2-M	3/5/2012	93.26	1079.21	985.95		MW-5-S	3/5/2012	87.7	1077.26	989.56
		6/6/2012	91.98	1079.21	987.23			6/6/2012	91.91	1077.26	985.35
		9/7/2012	95.36	1079.21	983.85			9/7/2012	95.43	1077.26	981.83
		12/10/2012	95.29	1079.21	983.92			12/10/2012	94.96	1077.26	982.3
	MW-2-M2	3/5/2012	93.49	1079.36	985.87		MW-6-M	3/5/2012	87.58	1077.35	989.77
		6/6/2012	92.2	1079.36	987.16			6/6/2012	91.89	1077.35	985.46
		9/7/2012	95.56	1079.36	983.8			9/7/2012	95.4	1077.35	981.95
		12/10/2012	95.47	1079.36	983.89			12/10/2012	94.88	1077.35	982.47
	MW-2-S	3/5/2012	92.92	1078.97	986.05		MW-6-M2	3/5/2012	87.34	1077.11	989.77
		6/6/2012	91.56	1078.97	987.41			6/6/2012	91.68	1077.11	985.43
		9/7/2012	94.9	1078.97	984.07			9/7/2012	95.2	1077.11	981.91
		12/10/2012	94.9	1078.97	984.07			12/10/2012	94.65	1077.11	982.46
	MW-3-M	3/5/2012	88.93	1079.41	990.48		MW-6-S	3/5/2012	87.43	1077.29	989.86
		6/6/2012	92.75	1079.41	986.66			6/6/2012	91.7	1077.29	985.59
		9/7/2012	96.15	1079.41	983.26			9/7/2012	95.35	1077.29	981.94
		12/10/2012	95.94	1079.41	983.47			12/10/2012	94.79	1077.29	982.5
	MW-3-M2	3/5/2012	88.8	1079.25	990.45		MW-7-S	3/5/2012	88.61	1078.31	989.7
		6/6/2012	92.58	1079.25	986.67			6/6/2012	92.89	1078.31	985.42
		9/7/2012	95.9	1079.25	983.35			9/7/2012	96.45	1078.31	981.86
		12/10/2012	95.77	1079.25	983.48			12/10/2012	95.92	1078.31	982.39
	MW-3-S	3/5/2012	88.31	1078.75	990.44						
		6/6/2012	92.16	1078.75	986.59						
		9/7/2012	95.59	1078.75	983.16						
		12/10/2012	95.37	1078.75	983.38						
	MW-4-M	3/5/2012	89.24	1079.27	990.03						
		6/6/2012	93.9	1079.27	985.37						
		9/7/2012	96.62	1079.27	982.65						
		12/10/2012	96.26	1079.27	983.01						

NOTE: TOC - Top of Casing S - Shallow Monitoring Zone M - First Intermediate Monitoring Zone
M2 - Second Intermediate Monitoring Zone ft bgs - feet below ground surface ft amsl - feet above mean sea level
- = data not applicable or available

Table 2 COC Groundwater Monitoring Results 2012

SITE	WELL	DATE	1,1,1-TCA	1,1,2-TCA	1,1-DCA	1,1-DCE	1,2-DCA	Chloroethane	c-1,2-DCE	PCE	t-1,2-DCE	TCE	VC
			µg/L										
505	**MW-1-M**	9/11/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	MW-1-M2	9/11/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	MW-1-S	3/6/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.81	<0.50	<0.50	<0.50
		9/11/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.54	<0.50	<0.50	<0.50
	MW-1-S-D	3/6/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.67	<0.50	<0.50	<0.50
		9/11/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.44	<0.50	<0.50	<0.50
501	**MW-2-M**	9/10/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	MW-2-M2	9/10/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	MW-2-S	3/6/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.60	<0.50	0.24	<0.50
		9/10/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.69	<0.50	0.39	<0.50
	MW-3-M	9/11/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	MW-3-M2	9/11/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	MW-3-S	3/6/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.20	<0.50	0.99	<0.50
		9/11/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.95	<0.50	1.50	<0.50
	MW-4-M	9/12/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	MW-4-S	3/7/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.42	<0.50	<0.50	<0.50
		9/12/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.30	<0.50	<0.50	<0.50
502	**MW-5-M**	9/13/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	MW-5-M2	9/13/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	MW-5-S	3/7/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.83	<0.50	<0.50	<0.50
		9/13/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.38	<0.50	<0.50	<0.50
	MW-6-M	9/12/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	MW-6-M2	9/12/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	MW-6-S	3/7/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.70	<0.50	0.97	<0.50
MCL/AWQS			**200**	**5**	**N/A**	**7**	**5**	**N/A**	**70**	**5**	**100**	**5**	**2**

Table 2 COC Groundwater Monitoring Results 2012

SITE	WELL	DATE	1,1,1-TCA	1,1,2-TCA	1,1-DCA	1,1-DCE	1,2-DCA	Chloroethane	c-1,2-DCE	PCE	t-1,2-DCE	TCE	VC
			µg/L										
502	**MW-6-S**	9/12/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.59	<0.50	0.32	<0.50
	MW-6-S-D	3/7/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.70	<0.50	1.00	<0.50
		9/12/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.57	<0.50	0.48	<0.50
	MW-7-S	3/7/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.80	<0.50	0.42	<0.50
		9/12/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Site	**PE**	3/7/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**5.80**	<0.50	**6.30**	<0.50
		9/12/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**5.10**	<0.50	**5.20**	<0.50
MCL/AWQS			**200**	**5**	**N/A**	**7**	**5**	**N/A**	**70**	**5**	**100**	**5**	**2**

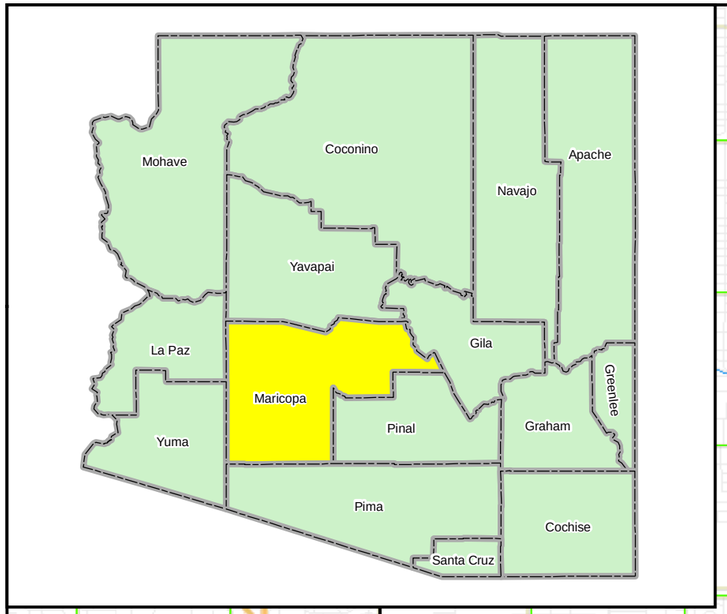
NOTE:
DCA - Dichloroethane
DCE - Dichloroethene
PCE - Tetrachloroethene
TCA - Trichloroethane
TCE - Trichloroethene
VC - Vinyl Chloride

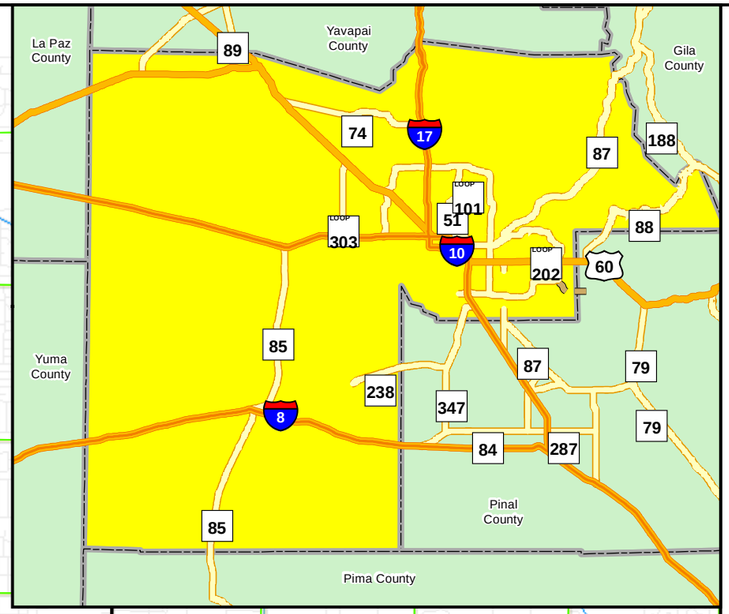
t - trans
c - cis
µg/L - micrograms per liter
D - Duplicate Sample

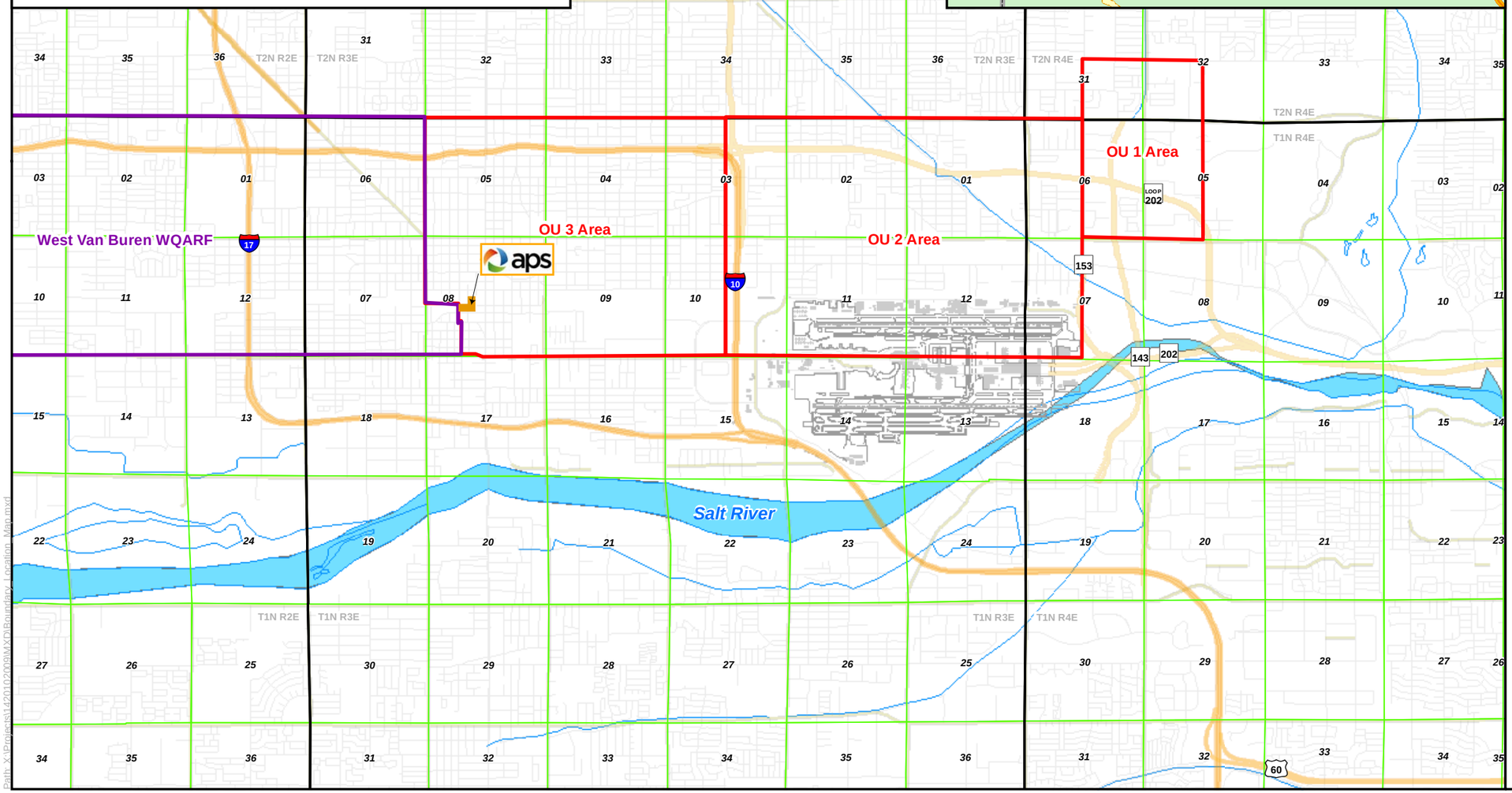
MW - Monitor Well
S - Shallow Zonw
M - First Intermediate Zone
M2 - Second Intermediate Zone

-Grey text indicates result was less than the reporting limit
-Bold values exceed the compounds Maximum Contaminant Level (MCL) (40 CFR Parts 141 and 142)/Arizona Aquifer Water Quality Standards (AWQS) (AAC Title R18-11)

FIGURES







501, 502, & 505 S. 2nd Ave Properties
Motorola 52nd Street Superfund Project, OU3
Phoenix, Arizona

Legend

- APS Boundary
- Operable Unit Boundary
- West Van Buren WQARF
- Township and Range
- Section Line
- Interstate Route
- US Route
- State Route
- Major Streets
- Local Route
- Water Features

N

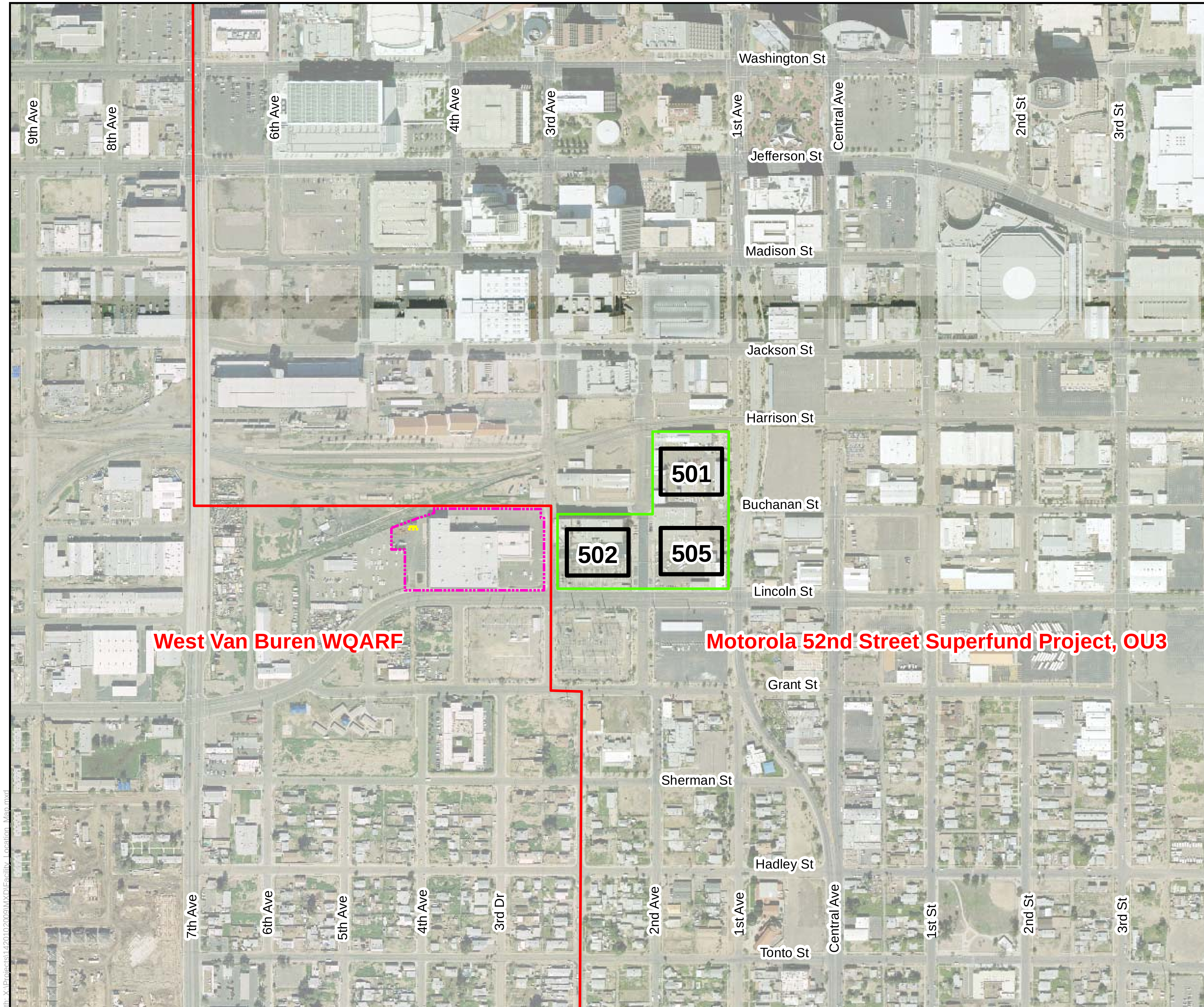
0 0.5 1 2
Miles

FIGURE 1

Motorola 52nd Street Superfund Site Operable Units and West Van Buren WQARF Boundary Location Map

JOB NO.:	09-114-03001
DATE:	01/2009
SCALE:	1" = 1 mile
DESIGN:	MLD
DRAWN:	MLD

501, 502, & 505 S. 2nd Ave Properties
Motorola 52nd Street Superfund Project, OU3
Phoenix, Arizona



Legend

- OU3 Area
- APS Facility Boundary
- APS Properties
- 320 West Lincoln Street
- Union Pacific Railroad Parcel

0 400 800 Feet

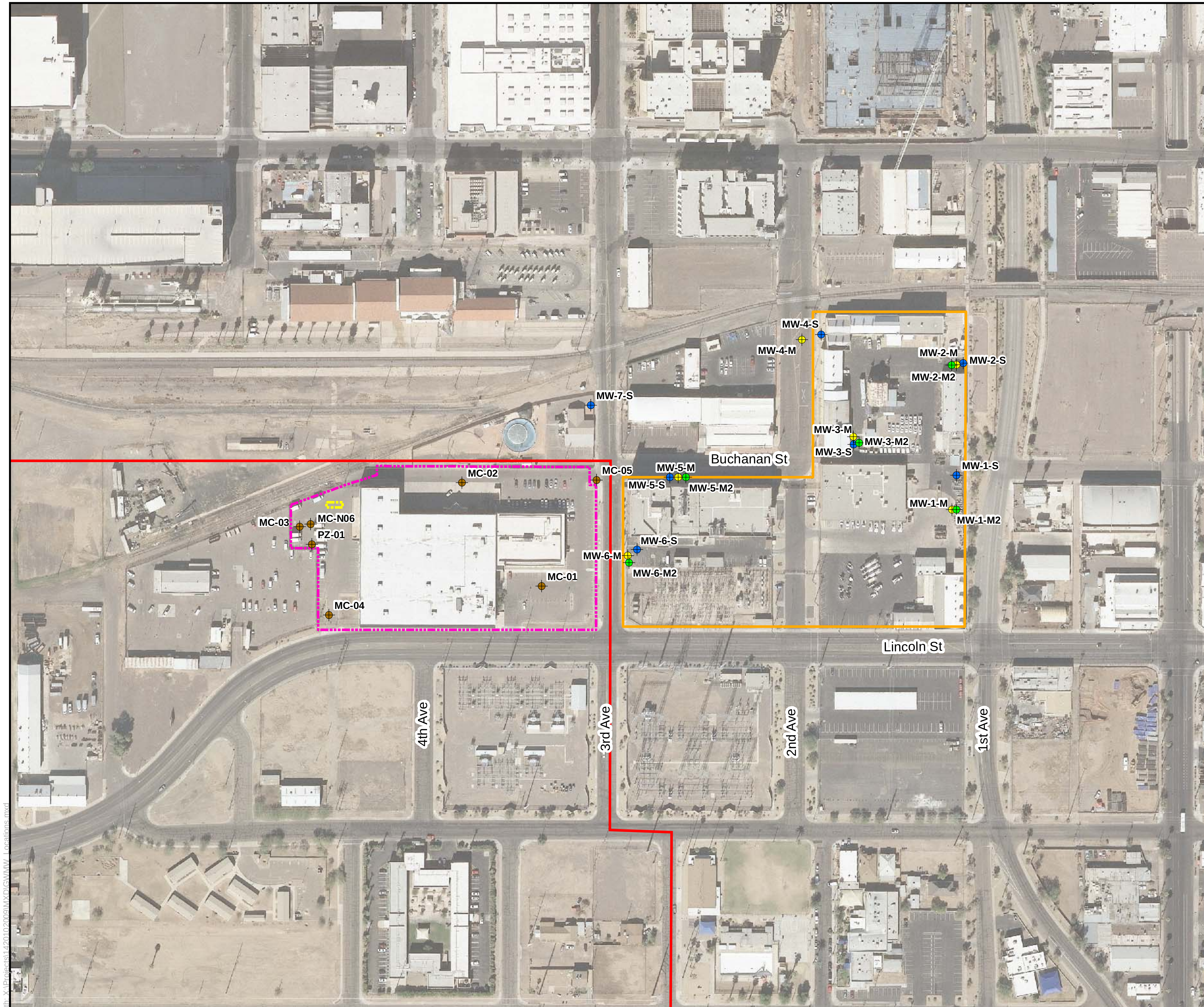
N

Aerial Photo Source:
Landiscor, Inc., taken 01/04

FIGURE 2

APS 501, 502 and 505 Properties and 320 West Lincoln Street Facility Location Map

JOB NO.:	14-2010-2009
DATE:	03/2011
SCALE:	1" = 400'
DESIGN:	LJM
DRAWN:	EAC



501, 502, & 505 S. 2nd Ave Properties
Motorola 52nd Street Superfund Project, OU3
Phoenix, Arizona

Legend

- APS Shallow Zone GWMWs
- APS 1st Intermediate Zone GWMWs
- APS 2nd Intermediate Zone GWMWs
- 320 W. Lincoln St. Shallow Zone GWMWs
- APS 502 Facility
- OU3 Study Area
- 320 West Lincoln Street
- Union Pacific Railroad Parcel

0 200 400 Feet

N

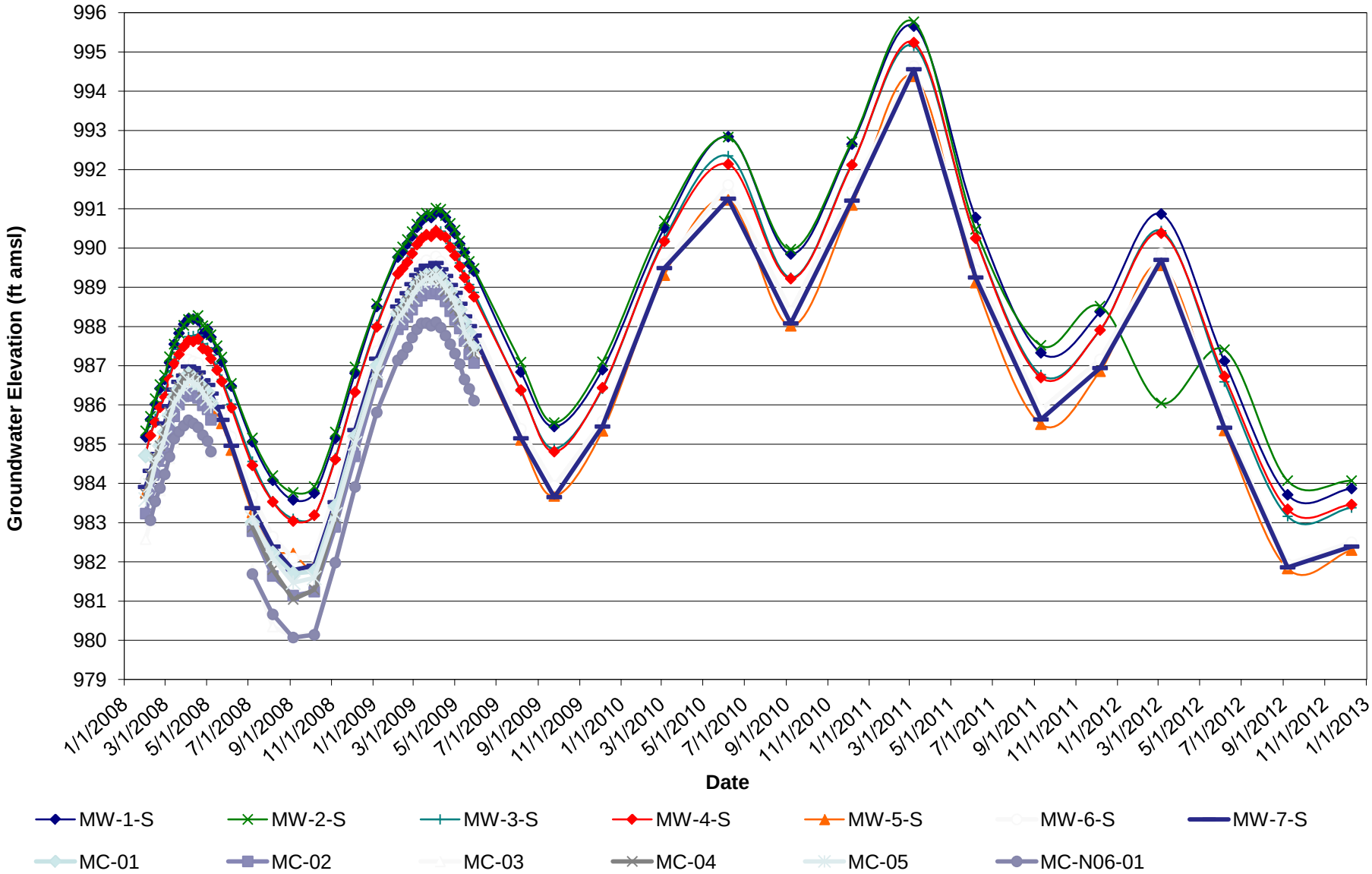
Aerial Photo Source:
Maricopa County Assessor's Office, 2010

FIGURE 3

Groundwater Monitoring Well Locations
APS & 320 W. Lincoln St. Facilities

JOB NO.:	14-2010-2009
DATE:	03/2011
SCALE:	1" = 200'
DESIGN:	LJM
DRAWN:	EAC

Path: X:\Projects\1420102009\MXD\GWMW_Locations.mxd



amec

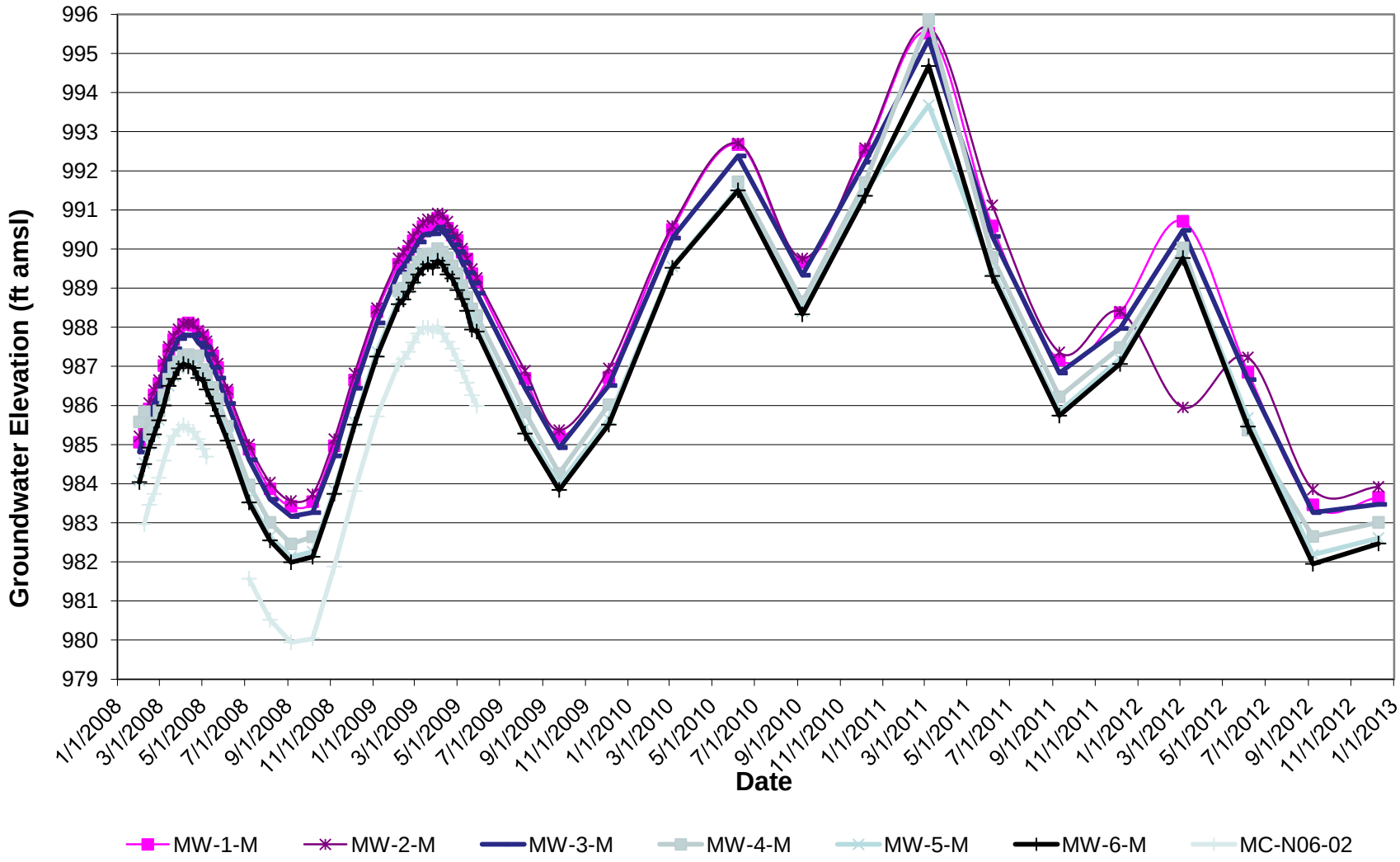
Job No.: 14-2012-2000
Design: LM
Drawn: JP
Date: 2/2013

Historical Shallow Groundwater Elevations
2008 through 2012

501, 502, and 505 S. 2nd Avenue Properties
Motorola 52nd Street Superfund Site, OU3
Phoenix, Arizona

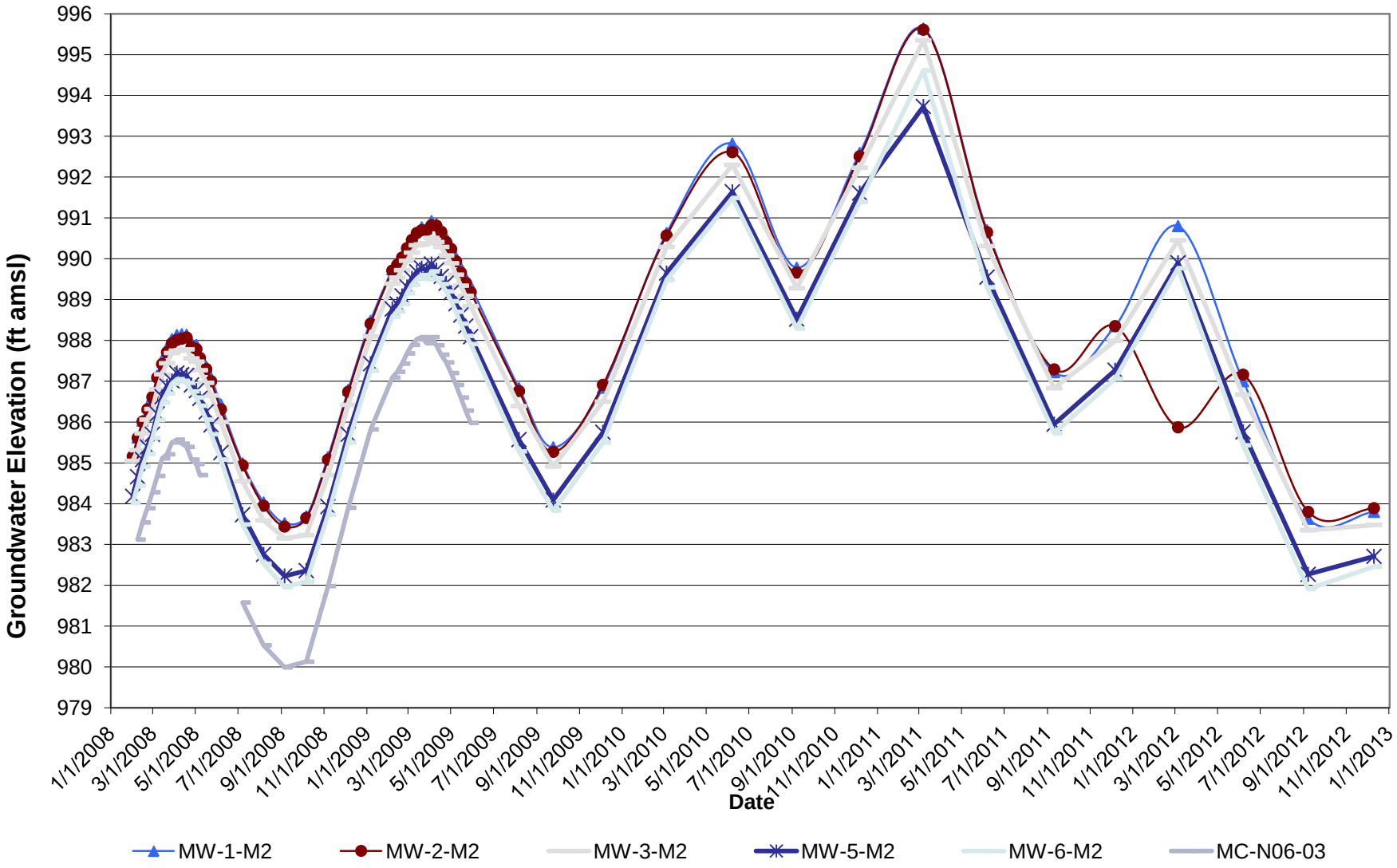
FIGURE
4

aps



amec	Job No.: 14-2012-2000 Design: LM Drawn: JP Date: 2/2013	**Historical Intermediate Groundwater Elevations 2008 through 2012** **501, 502, and 505 S. 2nd Avenue Properties** **Motorola 52nd Street Superfund Site, OU3** **Phoenix, Arizona**	**FIGURE** **5**

aps



amec

Job No.: 14-2012-2000
Design: LM
Drawn: JP
Date: 2/2013

Historical Second Intermediate Groundwater Elevations 2008 through 2012

501, 502, and 505 S. 2nd Avenue Properties
Motorola 52nd Street Superfund Site, OU3
Phoenix, Arizona

FIGURE
6

aps

501, 502, & 505 S. 2nd Ave Properties
Motorola 52nd Street Superfund Project, OU3
Phoenix, Arizona

Legend

- APS Buildings 501/502/505 Shallow Zone Monitoring Well Location
- 320 West Lincoln Street Shallow Zone Monitoring Well Location
- Groundwater Elevation Contours (Dashed Where Inferred) (Contour Interval = 0.2 feet)
- Groundwater Flow Direction (degrees) with Gradient (ft/ft)

Property Boundaries

- APS Property Boundary
- 320 West Lincoln Street
- Union Pacific Railroad Parcel
- OU3 Boundary

Notes and Abbreviations:

NM = Not Measured

Aerial Imagery Source:
Maricopa County Assessor's Office, 2010

0 60 120 Feet

N

Figure 7. Shallow Zone Wells Groundwater Flow Direction September 2012

501, 502 and 505 S. 2nd Avenue Properties
Motorola 52nd Street Superfund Site, OU3
Phoenix, Arizona

JOB NO.:	1420122000
DATE:	3/21/2013
SCALE:	1" = 120'
DESIGN:	JP
DRAWN:	EAC

Path: X:\Projects\2012 Projects\1420122000 APS OU3 2012\MXD\2012 Sampling\Figure7_Shallow_Flow.mxd

501, 502, & 505 S. 2nd Ave Properties
Motorola 52nd Street Superfund Project, OU3
Phoenix, Arizona

Legend

- APS Buildings 501/502/505 First Intermediate Zone Monitoring Well Location
- 320 West Lincoln Street First Intermediate Zone Monitoring Well Location
- Groundwater Elevation Contours (Dashed Where Inferred) (Contour Interval = 0.2 feet)
- Groundwater Flow Direction (degrees) with Gradient (ft/ft)

Property Boundaries

- APS Property Boundary
- 320 West Lincoln Street
- Union Pacific Railroad Parcel
- OU3 Boundary

Notes and Abbreviations:

NM = Not Measured

Aerial Imagery Source:
Maricopa County Assessor's Office, 2010

0 60 120 Feet

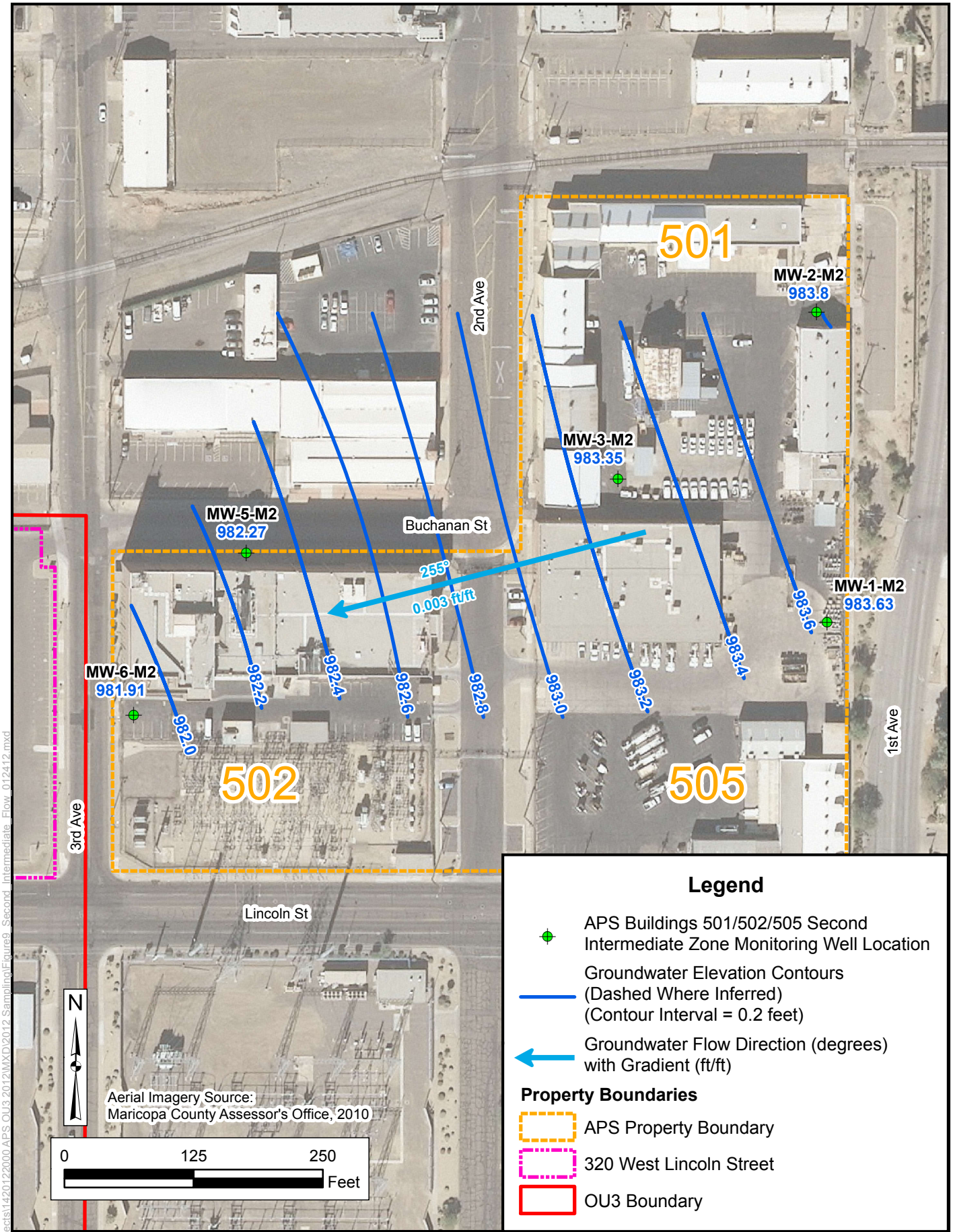
N

Figure 8. First Intermediate Zone Wells Groundwater Flow Direction September 2012

501, 502 and 505 S. 2nd Avenue Properties
Motorola 52nd Street Superfund Site, OU3
Phoenix, Arizona

JOB NO.:	1420122000
DATE:	3/21/2013
SCALE:	1" = 120'
DESIGN:	JP
DRAWN:	EAC

Path: X:\Projects\2012 Projects\1420122000 APS OU3 2012\MXD\2012 Sampling\Figures_First_Intermediate_Flow.mxd



Legend

- APS Buildings 501/502/505 Second Intermediate Zone Monitoring Well Location
- Groundwater Elevation Contours (Dashed Where Inferred) (Contour Interval = 0.2 feet)
- Groundwater Flow Direction (degrees) with Gradient (ft/ft)

Property Boundaries

- APS Property Boundary
- 320 West Lincoln Street
- OU3 Boundary

amec

JOB NO.:	1420122000
DATE:	3/21/2013
SCALE:	1" = 125'
DESIGN:	JP
DRAWN:	EAC

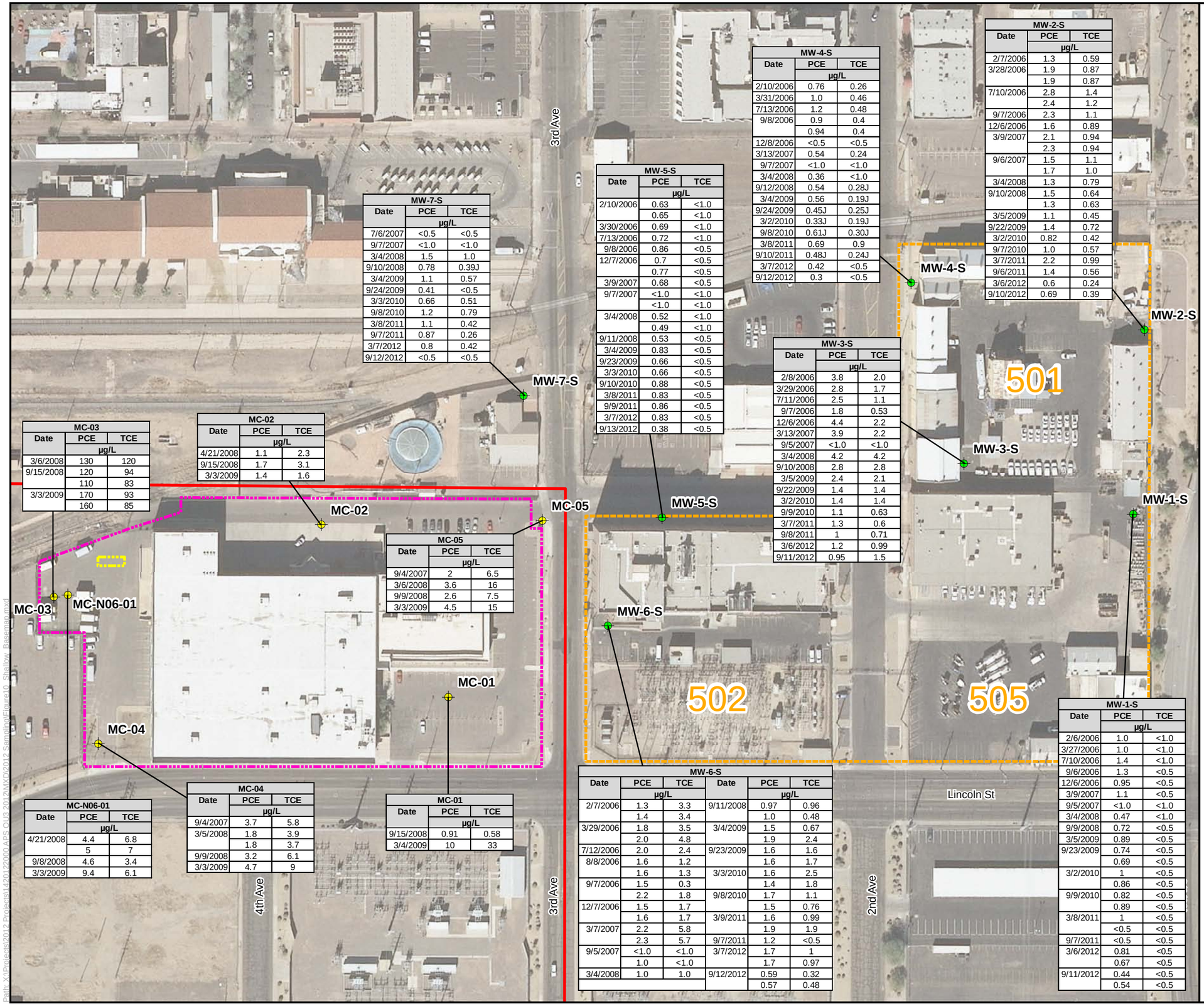
Second Intermediate Zone Wells
Groundwater Flow Direction-September 2011

APS 501, 502, & 505 S. 2nd Ave Properties
Motorola 52nd Street Superfund Project, OU3
Phoenix, Arizona

FIGURE
9

aps

Path: X:\Projects\2012 Projects\1420122000 APS OU3 2012\MXD\2012 Sampling\Figure9_Second_Intermediate_Flow_012412.mxd



MW-7-S		
Date	PCE	TCE
	µg/L	
7/6/2007	<0.5	<0.5
9/7/2007	<1.0	<1.0
3/4/2008	1.5	1.0
9/10/2008	0.78	0.39J
3/4/2009	1.1	0.57
9/24/2009	0.41	<0.5
3/3/2010	0.66	0.51
9/8/2010	1.2	0.79
3/8/2011	1.1	0.42
9/7/2011	0.87	0.26
3/7/2012	0.8	0.42
9/12/2012	<0.5	<0.5

MW-5-S		
Date	PCE	TCE
	µg/L	
2/10/2006	0.63	<1.0
	0.65	<1.0
3/30/2006	0.69	<1.0
7/13/2006	0.72	<1.0
9/8/2006	0.86	<0.5
12/7/2006	0.7	<0.5
	0.77	<0.5
3/9/2007	0.68	<0.5
9/7/2007	<1.0	<1.0
	<1.0	<1.0
3/4/2008	0.52	<1.0
	0.49	<1.0
9/11/2008	0.53	<0.5
3/4/2009	0.83	<0.5
9/23/2009	0.66	<0.5
3/3/2010	0.66	<0.5
9/10/2010	0.88	<0.5
3/8/2011	0.83	<0.5
9/9/2011	0.86	<0.5
3/7/2012	0.83	<0.5
9/13/2012	0.38	<0.5

MW-4-S		
Date	PCE	TCE
	µg/L	
2/10/2006	0.76	0.26
3/31/2006	1.0	0.46
7/13/2006	1.2	0.48
9/8/2006	0.9	0.4
	0.94	0.4
12/8/2006	<0.5	<0.5
3/13/2007	0.54	0.24
9/7/2007	<1.0	<1.0
3/4/2008	0.36	<1.0
9/12/2008	0.54	0.28J
3/4/2009	0.56	0.19J
9/24/2009	0.45J	0.25J
3/2/2010	0.33J	0.19J
9/8/2010	0.61J	0.30J
3/8/2011	0.69	0.9
9/10/2011	0.48J	0.24J
3/7/2012	0.42	<0.5
9/12/2012	0.3	<0.5

MW-2-S		
Date	PCE	TCE
	µg/L	
2/7/2006	1.3	0.59
3/28/2006	1.9	0.87
	1.9	0.87
7/10/2006	2.8	1.4
	2.4	1.2
9/7/2006	2.3	1.1
12/6/2006	1.6	0.89
3/9/2007	2.1	0.94
	2.3	0.94
9/6/2007	1.5	1.1
	1.7	1.0
3/4/2008	1.3	0.79
9/10/2008	1.5	0.64
	1.3	0.63
3/5/2009	1.1	0.45
9/22/2009	1.4	0.72
3/2/2010	0.82	0.42
9/7/2010	1.0	0.57
3/7/2011	2.2	0.99
9/6/2011	1.4	0.56
3/6/2012	0.6	0.24
9/10/2012	0.69	0.39

MW-3-S		
Date	PCE	TCE
	µg/L	
2/8/2006	3.8	2.0
3/29/2006	2.8	1.7
7/11/2006	2.5	1.1
9/7/2006	1.8	0.53
12/6/2006	4.4	2.2
3/13/2007	3.9	2.2
9/5/2007	<1.0	<1.0
3/4/2008	4.2	4.2
9/10/2008	2.8	2.8
3/5/2009	2.4	2.1
9/22/2009	1.4	1.4
3/2/2010	1.4	1.4
9/9/2010	1.1	0.63
3/7/2011	1.3	0.6
9/8/2011	1	0.71
3/6/2012	1.2	0.99
9/11/2012	0.95	1.5

MC-03		
Date	PCE	TCE
	µg/L	
3/6/2008	130	120
9/15/2008	120	94
	110	83
3/3/2009	170	93
	160	85

MC-02		
Date	PCE	TCE
	µg/L	
4/21/2008	1.1	2.3
9/15/2008	1.7	3.1
3/3/2009	1.4	1.6

MC-05		
Date	PCE	TCE
	µg/L	
9/4/2007	2	6.5
3/6/2008	3.6	16
9/9/2008	2.6	7.5
3/3/2009	4.5	15

MC-N06-01		
Date	PCE	TCE
	µg/L	
4/21/2008	4.4	6.8
	5	7
9/8/2008	4.6	3.4
3/3/2009	9.4	6.1

MC-04		
Date	PCE	TCE
	µg/L	
9/4/2007	3.7	5.8
3/5/2008	1.8	3.9
	1.8	3.7
9/9/2008	3.2	6.1
3/3/2009	4.7	9

MC-01		
Date	PCE	TCE
	µg/L	
9/15/2008	0.91	0.58
3/4/2009	10	33

MW-6-S					
Date	PCE	TCE	Date	PCE	TCE
	µg/L			µg/L	
2/7/2006	1.3	3.3	9/11/2008	0.97	0.96
	1.4	3.4		1.0	0.48
3/29/2006	1.8	3.5	3/4/2009	1.5	0.67
	2.0	4.8		1.9	2.4
7/12/2006	2.0	2.4	9/23/2009	1.6	1.6
8/8/2006	1.6	1.2		1.6	1.7
	1.6	1.3	3/3/2010	1.6	2.5
9/7/2006	1.5	0.3		1.4	1.8
	2.2	1.8	9/8/2010	1.7	1.1
12/7/2006	1.5	1.7		1.5	0.76
	1.6	1.7	3/9/2011	1.6	0.99
3/7/2007	2.2	5.8		1.9	1.9
	2.3	5.7	9/7/2011	1.2	<0.5
9/5/2007	<1.0	<1.0	3/7/2012	1.7	1
	1.0	<1.0		1.7	0.97
3/4/2008	1.0	1.0	9/12/2012	0.59	0.32
				0.57	0.48

MW-1-S		
Date	PCE	TCE
	µg/L	
2/6/2006	1.0	<1.0
3/27/2006	1.0	<1.0
7/10/2006	1.4	<1.0
9/6/2006	1.3	<0.5
12/6/2006	0.95	<0.5
3/9/2007	1.1	<0.5
9/5/2007	<1.0	<1.0
3/4/2008	0.47	<1.0
9/9/2008	0.72	<0.5
3/5/2009	0.89	<0.5
9/23/2009	0.74	<0.5
	0.69	<0.5
3/2/2010	1	<0.5
	0.86	<0.5
9/9/2010	0.82	<0.5
	0.89	<0.5
3/8/2011	1	<0.5
	<0.5	<0.5
9/7/2011	<0.5	<0.5
3/6/2012	0.81	<0.5
	0.67	<0.5
9/11/2012	0.44	<0.5
	0.54	<0.5

501, 502, & 505 S. 2nd Ave Properties
Motorola 52nd Street Superfund Project, OU3
Phoenix, Arizona

Legend

- APS Buildings 501/502/505 Shallow Zone Monitoring Well Location
- 320 West Lincoln Street Shallow Zone Monitoring Well Location

Property Boundaries

- APS Property Boundary
- 320 West Lincoln Street
- Union Pacific Railroad Parcel
- OU3 Boundary

Notes and Abbreviations:

J = Detected between Reporting Limit and Method Detection Limit
µg/L = Microgram per liter
PCE = Tetrachloroethane
TCE = Trichloroethane

Aerial Imagery Source: Maricopa County Assessor's Office, 2010

0 60 120 Feet

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Figure 10. Shallow Zone Wells PCE and TCE Concentrations February 2006 to September 2012

501, 502 and 505 S. 2nd Avenue Properties
Motorola 52nd Street Superfund Site, OU3
Phoenix, Arizona

JOB NO.: 1420122000
DATE: 2/25/2013
SCALE: 1" = 120'
DESIGN: JP
DRAWN: EAC

MW-4-M		
Date	PCE	TCE
	µg/L	
2/10/2006	0.22J	0.20J
3/31/2006	0.23J	0.19J
7/13/2006	<1.0	<1.0
9/8/2006	0.2	0.2
12/8/2006	<0.5	<0.5
3/13/2007	<0.5	0.23
9/7/2007	<1.0	<1.0
9/12/2008	<0.5	<0.5
9/24/2009	<0.5	<0.5
9/8/2010	<0.5	<0.5
9/10/2011	<0.5	<0.5
9/12/2012	<0.5	<0.5

MW-2-M		
Date	PCE	TCE
	µg/L	
2/8/2006	0.23J	0.21J
3/28/2006	0.18J	0.16J
7/11/2006	<1.0	<1.0
9/6/2006	0.2	<0.5
12/6/2006	<0.5	<0.5
3/9/2007	0.25	0.28
9/6/2007	<1.0	<1.0
9/10/2008	0.27J	<0.5
9/22/2009	<0.5	<0.5
9/7/2010	<0.5	<0.5
9/6/2011	0.27J	<0.5
9/10/2012	<0.5	<0.5

MW-5-M		
Date	PCE	TCE
	µg/L	
2/9/2006	0.3J	0.17J
3/30/2006	0.3J	0.20J
7/12/2006	<1.0	<1.0
9/8/2006	0.3	<0.5
12/7/2006	<0.5	<0.5
3/13/2007	0.22	0.22
9/6/2007	<0.1	<1.0
9/11/2008	<0.5	<0.5
9/23/2009	<0.5	<0.5
9/10/2010	<0.5	<0.5
9/9/2011	0.22J	<0.5
9/13/2012	<0.5	<0.5

MW-3-M		
Date	PCE	TCE
	µg/L	
2/8/2006	0.50J	<1.0
3/28/2006	0.32J	<1.0
7/11/2006	<1.0	<1.0
9/6/2006	<0.5	<0.5
12/7/2006	<0.5	<0.5
3/13/2007	0.23	<0.5
9/5/2007	<1.0	<1.0
9/10/2008	0.24J	<0.5
9/22/2009	<0.5	<0.5
9/9/2010	0.24J	0.23J
9/8/2011	0.25J	<0.5
9/11/2012	<0.5	<0.5

MC-N06-02		
Date	PCE	TCE
	µg/L	
9/4/2007	<1.0	<1.0
9/8/2008	0.27	0.32

MW-6-M		
Date	PCE	TCE
	µg/L	
2/7/2006	0.39J	0.15J
3/29/2006	0.40J	0.18J
7/12/2006	<1.0	<1.0
9/7/2006	0.51J	0.2
12/7/2006	<0.5	<0.5
3/13/2007	0.48	0.3
9/5/2007	<1.0	<1.0
9/11/2008	0.47J	0.45J
9/23/2009	0.31J	0.20J
9/8/2010	0.35J	0.26J
9/1/2011	<0.5	<0.5
9/12/2012	<0.5	<0.5

MW-1-M		
Date	PCE	TCE
	µg/L	
2/6/2006	0.21J	<1.0
3/27/2006	0.19J	<1.0
7/10/2006	<1.0	<1.0
9/6/2006	0.3	0.3
12/6/2006	<0.5	<0.5
3/9/2007	0.21	0.29
9/6/2007	<1.0	<1.0
9/9/2008	<0.5	0.21J
9/22/2009	<0.5	<0.5
9/9/2010	<0.5	<0.5
9/7/2011	1	<0.5
9/11/2012	<0.5	<0.5

3rd Ave
MW-4-M
MW-2-M
501
MW-3-M
MW-5-M
MW-1-M
MC-N06-02
MW-6-M
502
505
Lincoln St
4th Ave
3rd Ave
2nd Ave
1st Ave

501, 502, & 505 S. 2nd Ave Properties
Motorola 52nd Street Superfund Project, OU3
Phoenix, Arizona

Legend

- APS Buildings 501/502/505 First Intermediate Zone Monitoring Well Location
- 320 West Lincoln Street First Intermediate Zone Monitoring Well Location

Property Boundaries

- APS Property Boundary
- 320 West Lincoln Street
- Union Pacific Railroad Parcel
- OU3 Boundary

Notes and Abbreviations:

J = Detected between Reporting Limit and Method Detection Limit
µg/L = Microgram per liter
PCE = Tetrachloroethane
TCE = Trichloroethane

Aerial Imagery Source: Maricopa County Assessor's Office, 2010

0 60 120 Feet

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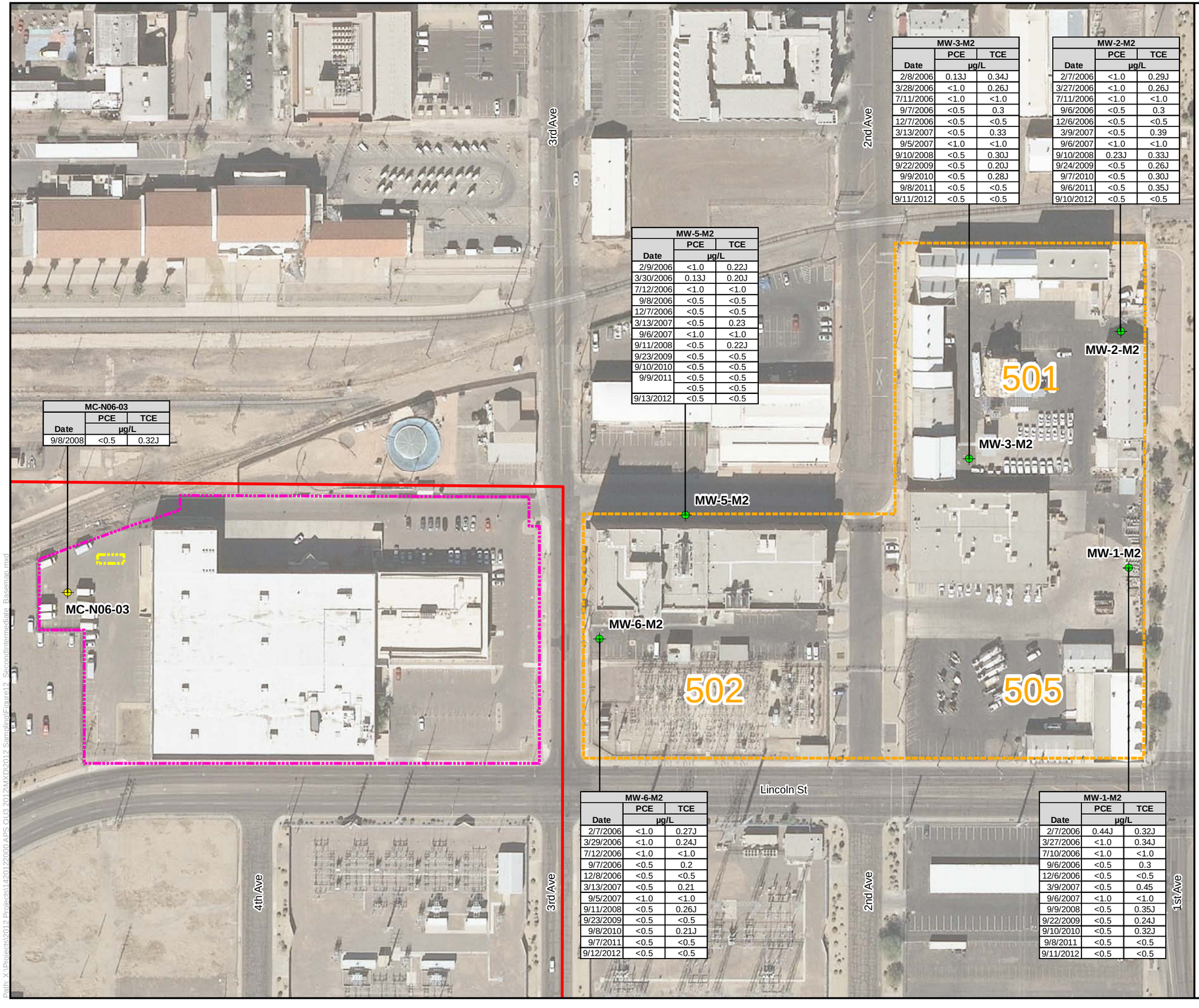
Figure 11. First Intermediate Zone Wells PCE and TCE Concentrations February 2006 to September 2012

501, 502 and 505 S. 2nd Avenue Properties
Motorola 52nd Street Superfund Site, OU3
Phoenix, Arizona

JOB NO.: 1420122000
DATE: 2/25/2013
SCALE: 1" = 120'
DESIGN: JP
DRAWN: EAC

path: X:\Projects\2012 Projects\1420122000 APS OU3 2012 PMX\2012 Sampling\Figure1_FirstIntermediate_Basemap.mxd



MW-3-M2		
	PCE	TCE
Date	µg/L	
2/8/2006	0.13J	0.34J
3/28/2006	<1.0	0.26J
7/11/2006	<1.0	<1.0
9/7/2006	<0.5	0.3
12/7/2006	<0.5	<0.5
3/13/2007	<0.5	0.33
9/5/2007	<1.0	<1.0
9/10/2008	<0.5	0.30J
9/22/2009	<0.5	0.20J
9/9/2010	<0.5	0.28J
9/8/2011	<0.5	<0.5
9/11/2012	<0.5	<0.5

MW-2-M2		
	PCE	TCE
Date	µg/L	
2/7/2006	<1.0	0.29J
3/27/2006	<1.0	0.26J
7/11/2006	<1.0	<1.0
9/6/2006	<0.5	0.3
12/6/2006	<0.5	<0.5
3/9/2007	<0.5	0.39
9/6/2007	<1.0	<1.0
9/10/2008	0.23J	0.33J
9/24/2009	<0.5	0.26J
9/7/2010	<0.5	0.30J
9/6/2011	<0.5	0.35J
9/10/2012	<0.5	<0.5

MW-5-M2		
	PCE	TCE
Date	µg/L	
2/9/2006	<1.0	0.22J
3/30/2006	0.13J	0.20J
7/12/2006	<1.0	<1.0
9/8/2006	<0.5	<0.5
12/7/2006	<0.5	<0.5
3/13/2007	<0.5	0.23
9/6/2007	<1.0	<1.0
9/11/2008	<0.5	0.22J
9/23/2009	<0.5	<0.5
9/10/2010	<0.5	<0.5
9/9/2011	<0.5	<0.5
	<0.5	<0.5
9/13/2012	<0.5	<0.5

MC-N06-03		
	PCE	TCE
Date	µg/L	
9/8/2008	<0.5	0.32J

MW-6-M2		
	PCE	TCE
Date	µg/L	
2/7/2006	<1.0	0.27J
3/29/2006	<1.0	0.24J
7/12/2006	<1.0	<1.0
9/7/2006	<0.5	0.2
12/8/2006	<0.5	<0.5
3/13/2007	<0.5	0.21
9/5/2007	<1.0	<1.0
9/11/2008	<0.5	0.26J
9/23/2009	<0.5	<0.5
9/8/2010	<0.5	0.21J
9/7/2011	<0.5	<0.5
9/12/2012	<0.5	<0.5

MW-1-M2		
	PCE	TCE
Date	µg/L	
2/7/2006	0.44J	0.32J
3/27/2006	<1.0	0.34J
7/10/2006	<1.0	<1.0
9/6/2006	<0.5	0.3
12/6/2006	<0.5	<0.5
3/9/2007	<0.5	0.45
9/6/2007	<1.0	<1.0
9/9/2008	<0.5	0.35J
9/22/2009	<0.5	0.24J
9/10/2010	<0.5	0.32J
9/8/2011	<0.5	<0.5
9/11/2012	<0.5	<0.5

501, 502, & 505 S. 2nd Ave Properties
Motorola 52nd Street Superfund Project, OU3
Phoenix, Arizona

Legend

- APS Buildings 501/502/505 Second Intermediate Zone Monitoring Well Location
- 320 West Lincoln Street Second Intermediate Zone Monitoring Well Location

Property Boundaries

- APS Property Boundary
- 320 West Lincoln Street
- Union Pacific Railroad Parcel
- OU3 Boundary

Notes and Abbreviations:

J = Detected between Reporting Limit and Method Detection Limit
µg/L = Microgram per liter
PCE = Tetrachloroethane
TCE = Trichloroethane

Aerial Imagery Source: Maricopa County Assessor's Office, 2010

0 60 120 Feet

N

Figure 12. Second Intermediate Zone Wells PCE and TCE Concentrations February 2006 to September 2012

501, 502 and 505 S. 2nd Avenue Properties
Motorola 52nd Street Superfund Site, OU3
Phoenix, Arizona

JOB NO.:	1420122000
DATE:	2/25/2013
SCALE:	1" = 120'
DESIGN:	JP
DRAWN:	EAC

path: X:\Projects\2012 Projects\1420122000 APS OU3 2012\MXD\2012 Sampling\Figure12_SecondIntermediate_Basemap.mxd